SUPERIOR MICRO-NEEDLES FOR MANIPULATING AND DISSECTING SOIL INVERTEBRATES

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Sturdy, yet very sharp, needles for dissecting microarthropods or manipulating small objects cannot be purchased, but can be easily made with little equipment. The standard use of insect minuten-pins is often not satisfactory due to poor quality control, improper taper, flaking and corrosion and other problems which can be avoided by electrolytically produced needles.

A suggested apparatus is shown in the accompanying figure. A deep well slide is attached to the bottom of a standard petri-dish with a strong epoxy cement (the top covers the apparatus when not in use). Then an old microscope stage slip (or a similarly shaped piece of thin aluminum sheeeting) is epoxyed to the slide, with the bent tip pointing into the well (touching the bottom, if possible) and the other end bent upwards about 1/2 inch. Cover the clip with epoxy, except at the bent ends.

The needle is cut from 10 mil (0.25 mm) tungsten wire, and held in a zero-closure pin-holder. Wire can be obtained, for example, from Alfa Products, Thiokol/Ventron Division, 152 Andover Street, Danvers, MA 01923 (catalogue #0371) and costs about $20 (U.S.) for a 20 m roll (a life-time supply). The pin-holders can be obtained from Fine Science Tools Inc., 321-B Mountain Highway, North Vancouver, B.C. V7J 2K7 and cost $8-10 (U.S.) each depending on style and length. Good holders are recommended, rather than cheaper varieties which are not zero-closure.

The only other necessary equipment is a D.C. power supply, about 5-10 volts and 0.5-1.0 amp. Some calculator-style supplies are satisfactory, but a transformer from an old stereo-microscope or compound microscope illuminator would be ideal. Also, the output leads from the transformer need to be supplied with electrical attachment clips for good contact.

In operation, one fills the well with 10% KOH, attaches one lead to the clip of the well slide and the other to the end of the pin-holder (with the appropriate length of wire in place). Correct polarity is essential, but usually has to be determined the first time by trial and error (if the wire does not sharpen after a half minute or so, switch leads). Once the transformer is activated and the needle is placed in the KOH, rapid bubbling should surround the needle. Rate of electrolysis is controlled by the transformer setting and the distance the needle is held from the well-slide clip. A good simple needle can be made in less than one minute.

The desired taper of the needle is a function of its projected use and individual preference. Taper can be controlled by the angle at which the needle is immersed in the KOH bath.

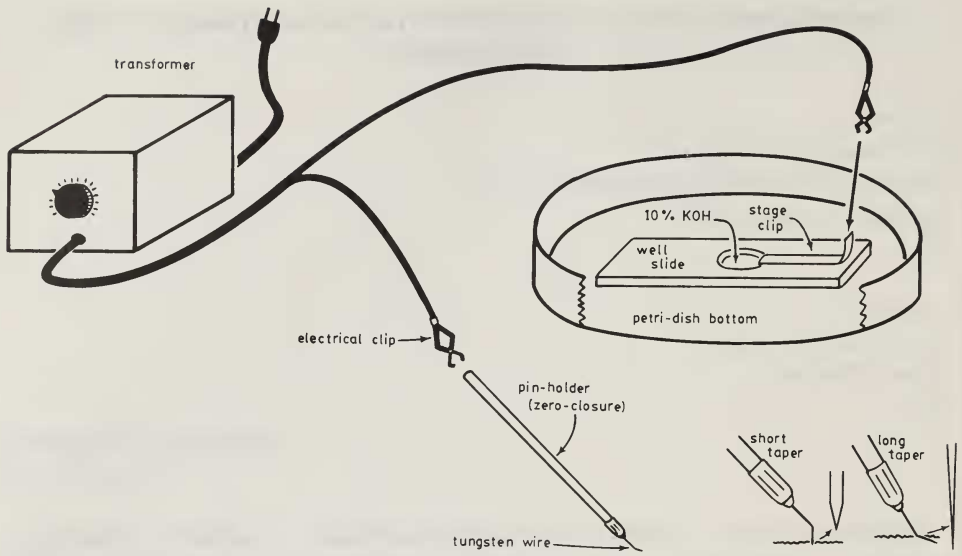

Fig. 1. Diagram of Equipment and Procedure for Manufacture of Micro-Needles used in Morphological Dissection of Soil Invertebrates.

Near-vertical orientation produces a short, thick taper; near horizontal orientation produces a long, fine taper. The tip will be destroyed if accidentally touched to the well-slide clip while current is on.

Bending the needle with forceps prior to electrolysis is usually desirable for working comfort. Micro-hooks can be first bent, then electrolyzed; another way is to first taper a needle in the usual way and then press it against a hard object to curl it, with finishing touches put on after that.

Electrolysis causes a mist of KOH to be produced, so a good place to work is in a fume-hood. Have a nearby stereo-microscope set up to intermittently check progress, but do not operate too close to the microscope. Once formed, needles can be redressed in a few seconds and the tungsten wire need be replaced (or re-bent) only after repeated quick sharpenings. Since the tips are very fine, cover the end of the pin-holder when not in use. The cut-off tips of soft plastic disposable eye-droppers serve nicely, as do some of the stiffer rubber bulbs, or tubings.